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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/539,024 | 10/11/2005 | Rathindra N. Bose | 2384.00059 | 7380 |

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| 7590 Kohn & Associates Suite 410 30500 Northwestern Highway Farmington Hills, MI 48334 | 10/09/2007 |
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| EXAMINER LEADER, WILLIAM T | |
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| ART UNIT 1795 | PAPER NUMBER |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/539,024 | Applicant(s) BOSE ET AL | |
| | Examiner William T. Leader | Art Unit 1753 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
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| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>2/23/2007</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

1. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 recites voltammetrically electrodepositing a metal on a carbon article. Claim 3 depends on claim 2 which depends on claim 1, and recites subjecting the carbon article to varying electrical potentials. It is not clear what claim 3 adds to claim 2 since the cyclic voltammetric electrodeposition of claim 1 appears to require the application of varying electrical potentials.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Verbrugge (5,284,571).

3. The Verbrugge patent is directed to a method of making electrodes for electrochemical cells. As shown in example 1, the substrate is a gas-diffusion electrode prepared in the form of an essentially planar carbon electrode. This substrate corresponds to the carbon article recited in instant claim 1. The substrate was contacted with a 10 mM $\text{Pt}(\text{NH}_3)_4\text{Cl}_2$ solution, a voltage was

applied, and platinum was deposited. In example 3, the basic method of example 1 was used to electrodeposit a catalyst on electrode substrates via a rotating disk method. A sweep-rate of 100 mV/s was employed along with a rotation speed of 1,000 rpm. Platinum was deposited at between 0 and -0.8 volts referred to a Ag/AgCl reference electrode. At potentials negative to -1 volt, hydrogen evolved on the electrode surface. For potentials greater than 0.5 volts, oxygen evolved. The method utilized by Verbrugge in example 3 corresponds to the cyclic voltammetrical electrodeposition in instant claim 1. With respect to claim 2, the carbon article of Verbrugge was immersed in a solution containing platinum as a reducible metal. With respect to claim 3, Verbrugge applied a varying electrical potential. With respect to claim 4, Verbrugge used a sweep rate of 100 mV/s. This is the same rate recited in claim 4. Verbrugge also indicated that platinum was deposited at between zero and -0.8 volts. This indicted that the voltage was swept between about zero and about -1.0 volts as recited in claim 4. Verbrugge reports observations made at -1.0 volts and 0.5 volts indicating that the voltage assumed these values during the process. With respect to claim 5, a desired amount of metal was deposited. With respect to claim 24, in example 1 a potential of -2.0 volts was applied. All steps of the methods recited in claims 1-5 and 24 are met by Verbrugge.

4. Claims 6-12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Verbrugge (5,284,571).
5. Claims 6-12 are written as product-by-process claims. It is not apparent that the products of claims 6-12 differ from the products of Verbrugge. See MPEP 2113. With respect to claims 7

and 8, Verbrugge teaches the use of a planar carbon electrode (example 1). With respect to claim 9, the electrode of Verbrugge is suitable for use as a fuel cell electrode. With respect to claim 10, the metal deposited is platinum. With respect to claim 11, the article is a platinum-coated carbon electrode. With respect to claim 12, Verbrugge states that example 1 yields near 0.1 mg/cm² of platinum loading (column 8, lines 48-50).

6. Claims 13-18 and 22-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Verbrugge (5,284, 571). Verbrugge is taken as above. The limitations of these claims are similar to those discussed above.

7. Claims 6-12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hards et al (5,501,915).

8. The Hards et al patent is directed to an electrode for use in a fuel cell. Hards discloses that carbon paper is a suitable substrate (column 6, lines 23-26). Any suitable precious metal catalyst may be used, for example a catalyst comprising one or more platinum group metals or alloys thereof, such as platinum or an alloy thereof (column 5, lines 16-18). It is not apparent that the products of claims 6-12 differ from the product of Hards et al. With respect to claim 7, as noted, Hards et al disclose the use of carbon paper as a suitable substrate. With respect to claims 8 and 9, the article of Hards et al is suitable for use as a fuel cell electrode. With respect to claims 10 and 11, Hards et al disclose the deposition of one or more platinum group metals, including platinum. With respect to claims 12 Hards et al disclose a loading of the precious

metal of 0.01-1.0 mg/cm² (column 5, lines 54-58). This range and that of applicant overlap. In the overlapping region, the values recited by applicant are anticipated.

9. Claims 13-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Hards et al (5,501,915).

10. The Hards et al patent is taken as above. With respect to claims 19-21, the ranges recited overlap the range of 0.01-1.0 disclosed by Hards et al. In the regions where the claims overlap, Hards anticipates the coating amounts recited in claims 19-21. With respect to claim 22, the metal-coated carbon article of Hards et al is capable of reducing oxygen in phosphoric acid, neutral, and basic media. With respect to claim 23, the article of Hards et al is capable of rendering active platinum surfaces for charge accumulation through hydrogen deposition and release.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verbrugge (5,284,5471) in view of Reddy et al (5,084,14).

14. Verbrugge and Reddy et al are taken as above. As previously noted, Verbrugge discloses a platinum loading of near 0.1 mg/cm^2 in example 1, while Reddy et al discloses that useful loadings of a platinum group metal on a carbon substrate range from $0.01\text{-}1.0 \text{ mg/cm}^2$. Use of a loading in the range of $0.01\text{-}0.1 \text{ mg/cm}^2$ in the Verbrugge electrode as taught by Reddy et al would have been obvious at the time the invention was made because less precious metal would have been consumed in the manufacture of the electrodes and the cost would have been reduced.

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reddy et al (5,084,144) discloses a platinum-coated carbon electrode.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 571-272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



William Leader
September 30, 2007



SUSY TSANG-FOSTER
PRIMARY EXAMINER